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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

HO, TU TU V

ART UNIT PAPER NUMBER

2818

DATE MAILED: 07/03/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

#10

Office Action Summary

Application No.

09/944,246

Applicant(s)

FEE ET AL.

Examiner

Tu-Tu Ho

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 June 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 10 and 36-38 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 11-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 January 2002 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

1. Preliminary Amendment filed 22 January 2002 has been considered. Formal Drawings and Request for Corrected Filing Receipt have also been placed of record in the file.

Priority

2. A claim for Foreign Priority is acknowledged. However, to meet requirements under 35 U.S.C. 119(a)-(d), **certified copy of the priority document must be submitted.**

Election/ Restriction

3. Applicant's election of Group "a" claims 1-9, 11-35, and 38 (Embodiment of all figures except 10 and 11) in Paper No. 9 filed 11 June 2002 is acknowledged with appreciation. In fact, claims 10, 36-37, **and 38** are indeed drawn to a microelectronic device and method of manufacturing thereof characterized in a staggered configuration of lead fingers (claim 38 recites the feature as "...first electrical leads being spaced from the peripheral of the encapsulant" in a cross-sectional view) which provides a material improvement (present invention, specification, Page 16) and as depicted in Figures 10 and 11. Accordingly, claims 10, 36-37, **and 38** are withdrawn from consideration.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

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(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in-

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

5. Claims 1-9, 11-12, 15, 17-18, 22-23, and 32-35 are rejected under 35 U.S.C. 102(e), paragraph (1) as being anticipated by Huang U.S. Patent Publication 2002/0027273.

Huang discloses in Figures 3-12 and respective portions of the specification a method of assembling a microelectronic device assembly and a microelectronic device assembly with all limitations recited in these claims.

Referring to claim 1, Huang discloses a method of assembling a microelectronic device assembly, comprising:

(Figure 10A) releasably attaching a support 340/345/310 (310 and 345 are adhesive) to a lead frame 332 (Figures 10B and 11B), the lead frame having a thickness and having an opening passing through the thickness, the support having an exposed surface spanning the opening;

releasably attaching a back surface of a microelectronic device 31 to the exposed surface of the support (using adhesive 310);

electrically coupling the microelectronic device to the lead frame;

delivering an encapsulant 39 (Figures 3 and 11E) to a cavity defined by the support, the microelectronic device, and a peripheral dam carried by the lead frame, the encapsulant bonding the microelectronic device to the lead frame; and

removing the support (Figure 11F), leaving the back surface of the microelectronic device exposed.

The limitations of claims 2-4 are clearly depicted in Figures 11.

With respect to claim 5, the method of claim 3 described above wherein an upper surface of the encapsulant 39 is aligned with the upper surface of the lead frame 33 (Figure 11G).

Referring to claim 6, Figure 11G also shows bond wires 37 coupling the active surface of the die to the lead frame.

With respect to claim 9, the method of claim 1 described above wherein removing the support 340 exposes a lower surface of each of a plurality of lead fingers 33, the exposed lower surfaces being peripherally aligned (Figure 11G).

The limitations of claims 7-8 and 11 are clearly depicted in Figures 11.

Claims 12 and 15 are basically the same as claim 1.

Figure 12 basically depicts all limitations of claims 17 and 32, 18, and 23.

Referring to claims 22 and 33, the method of claims 17 and 32 described above wherein electrically coupling the first and second lead fingers spaces the second die from the first encapsulant to define an intercomponent gap (Figure 12, no number) between the second die and the first encapsulant.

Regarding claims 34 and 35, at least two of the lead fingers are electrically coupled to the substrate 338 (Figure 12).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. §103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 13-14, 16, 19-21, and 24-31 are rejected under 35 U.S.C. §103(a) as being unpatentable over Huang.

Referring to claims 13-14, 16, 19-21, and 24-29, in addition the limitations of claims 1, 12, and 17 as described above, Huang discloses a method for separating individual packages by simply cutting (Figures 11F and 11G) leads 33 right in the middle. Although Huang does not disclose separating the lead fingers from the outer member and fail to disclose explicitly that doing so prior to electrically coupling lead fingers, as recited in these claims, both methods serve the purpose of assembly equally well. It appears that these changes are only a matter of design choice.

Claims 30 and 31 are basically the same as claims 22 and 23.

8. Claims 1-9 and 11-35 are rejected under 35 U.S.C. §103(a) as being unpatentable over Asada et al. U.S. Patent 5,665,651 in view of Mostafazadeh et al. U.S. 6,117,710 or in view of Park et al. U.S. Patent 6,137,162.

Asada et al. disclose in figures 4-16, specifically Figures 14 and 15, and respective portions of the specification a microelectronic structure and method of assembling having all

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limitations as claimed except for the fact that a back surface of the microelectronic device is not exposed. However, exposing an element to the environment rather than encapsulated to promote thermal dissipation is well known in the art. Mostafazadeh et al. disclose a molded plastic package using a temporary adhesive layer wherein a surface of die 120 is exposed (Figure 7) to improve heat dissipation (column 1, lines 42-45). Park et al. disclose a staked chip package having a surface of chip 104 exposed (Figure 5) so that heat generated from the chip is easily dissipated.

Would it be obvious for one of ordinary skills in the art at the time the invention was made to modify the structure of Asada et al. in view of Mostafazadeh et al. and Park et al. and by doing so, would the modification destroy the basic structure of Asada et al. ? Looking at Figure 5 of Asada et al.'s reference again, one would have to simply eliminate elements 2 and 3, and instead, use a temporary support layer like layer 170 depicted in Figure 6 of Mostafazadeh et al.'s reference. It is clear that one would be able to modify and would not destroy the basic structure of Asada et al. in view of Mostafazadeh et al. and Park et al. that when a surface of an IC/die/chip/microelectronic element exposed to the environment, thermal dissipation is enhanced.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. U.S. Patent 6,297,543 to Hong et al. disclose a chip scale package wherein a lead frame is bonded to a bottom surface of a semiconductor chip.

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10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tu-Tu Ho whose telephone number is (703) 305-0086. The examiner can normally be reached on 6:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, DAVID NELMS can be reached on (703) 308-4910. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1782.

TH

Tu-Tu Ho
June 29, 2002



HOAI HO
PRIMARY EXAMINER